

Comment in Response to FCC NPRM Proceeding 04-37

Federal Communications Commission
Washington, DC

May 3, 2004

Re NPRM Proceeding 01-37 Broadband over Power Lines (BPL)

This comment and subsequent recommendations are based on my personal observations at BPL test sites, operated in Wake County by Progress Energy Corporation (PEC), NC from January 15, 2004 through April 24, 2004. This is applicable to protection of the Amateur Radio portions of the spectrum, as well as the "sensitive frequencies" listed in the NTIA report, Volume I.

At the outset, I wish to make clear that, based on my own recent, experienced and enlightened observations, I am adamantly opposed to the introduction of Access BPL technology in it's current technological state

Harmful interference. The observed spectrum emitted from the first days of deployment had broad swaths of BPL carriers, which totally obscured portions of the Amateur Radio spectrum. After receiving formal complaints, the utility attempted to move their harmful interference out of the Amateur Radio spectrum. They did not fully succeed, partly for reasons indicated herein.

From first-hand observations of the significant harmful interference delivered to the Amateur Radio frequency allocations and attempts by Progress Energy and their vendor, Amperion, to "notch" the Amateur frequencies from the overhead (alone) portions to the subject BPL systems, it is clearly apparent that existing methodologies do not exist within the currently deployed and observed systems.

Existing notching capability flawed. Attempts at "notching" resulted in signals near the center of the "notches" being significantly attenuated, but signals near the edges of the "notches" were not. Closer observation suggested that the filter(s) being implemented were not clean rectangular-form filters as would be desired, but were filters exhibiting a design where the filter "skirts" (edges) follow some less-than-optimum mathematical form. To this writer, that indicates a fundamental lack of inherent capability within the BPL equipment design.

The results of the local BPL trials, despite months of efforts by the BPL system manufacturer and the Utility left residual harmful interference products within the Amateur Radio allocations.

Avoidance instead of mitigation. The suggestion from BPL manufacturers and proponents that interference can be mitigated is flawed from several perspectives

Experience with failed attempts at mitigation confirms the immature and technically underpowered equipment design which is insufficient to adequately remove offending portions of the BPL signals that fall onto spectrum allocated to and used by, Licensed Services.

Clearly, the practical means of preventing harmful interference to known spectrum users is to simply avoid encroachment in the initial system design. This simple concept obviates the likelihood of a great amount of subsequent "mitigation" efforts.

The spectrum allocated to, and used by, most domestic users is known and was recently illustrated in an NTIA report dealing specifically with the responsible deployment of BPL. A graphic depiction of the NTIA listed frequencies is provided below as Figure 1

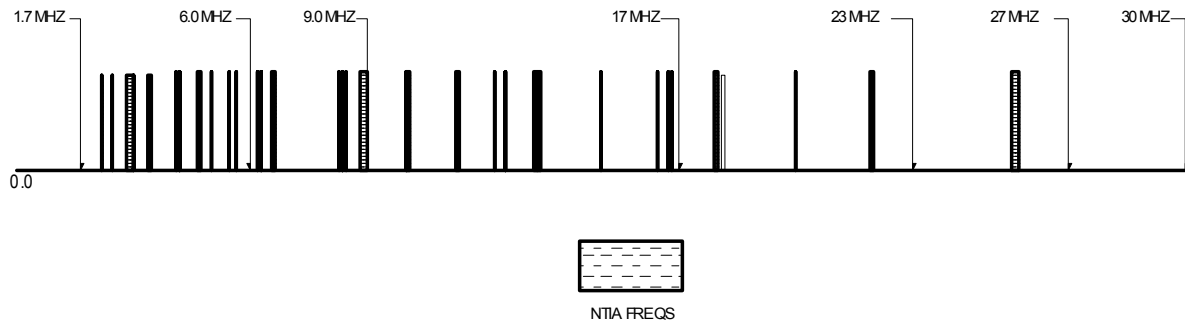


Figure 1

A graphic depiction of the NTIA listed frequencies and the Amateur Radio spectrum combined is shown below Figure 2.

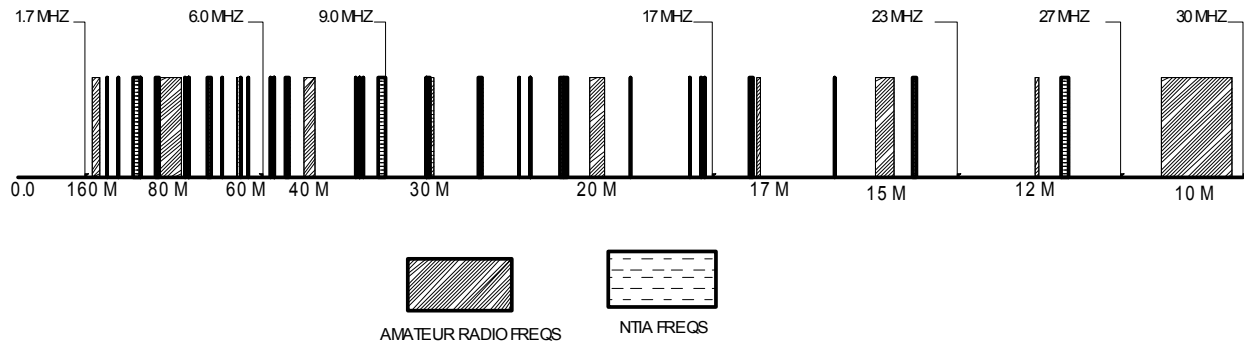


Figure 2

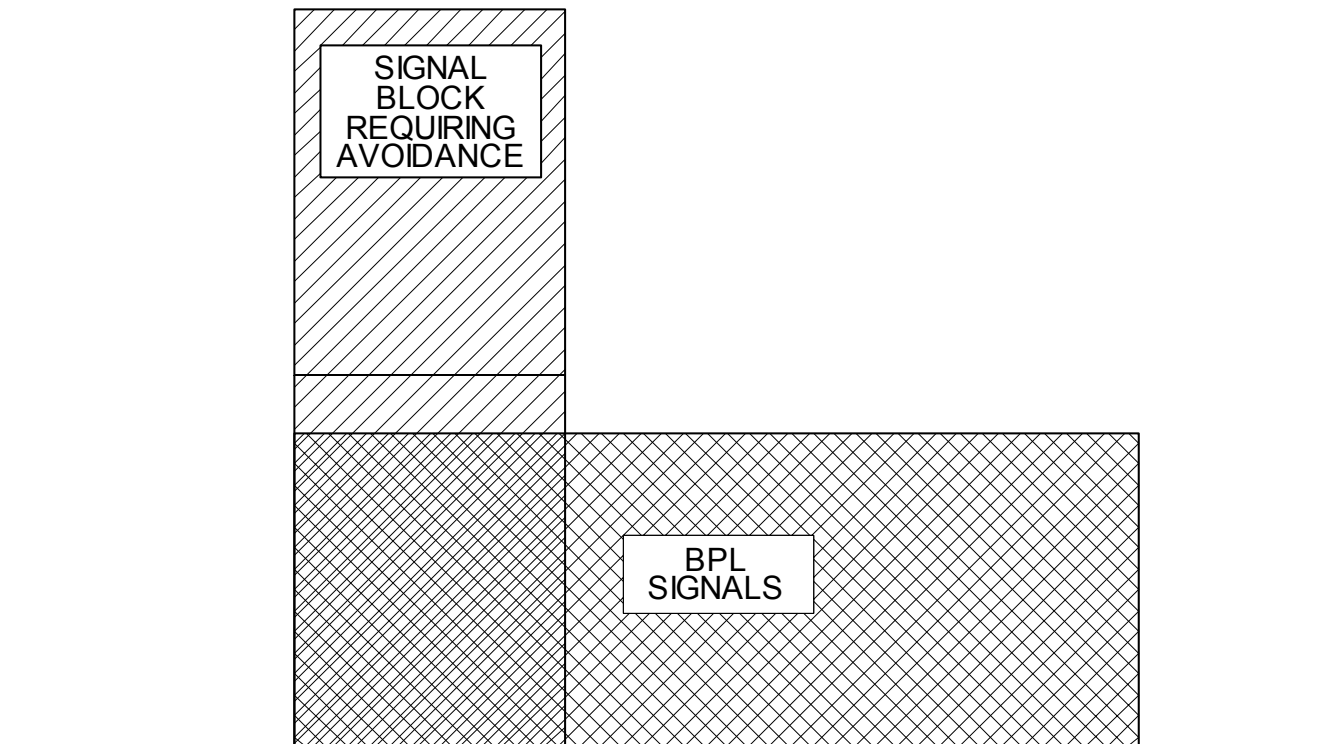
Additional filtering requirements. In addition to frequency avoidance in system design, the existing antiquated filtering mechanisms must be replaced with commonly employed "brick wall" filter topology.

While most BPL manufacturers label their designs as proprietary, they are stated to be based upon DSP (Digital Signal Processor) architecture and devices. DSP devices are ubiquitous and are employed in common consumer devices such as cell phones, automobiles and audio systems. In the case of common audio systems, DSP-implemented filters provide the features and usefulness that is extant in even the lowest level device.

The technology needed to design and implement various DSP filter topologies is readily available from many sources, as is the skill base to effect such a design. Virtually all Electrical Engineering schools have a substantial syllabus focused on this subject.

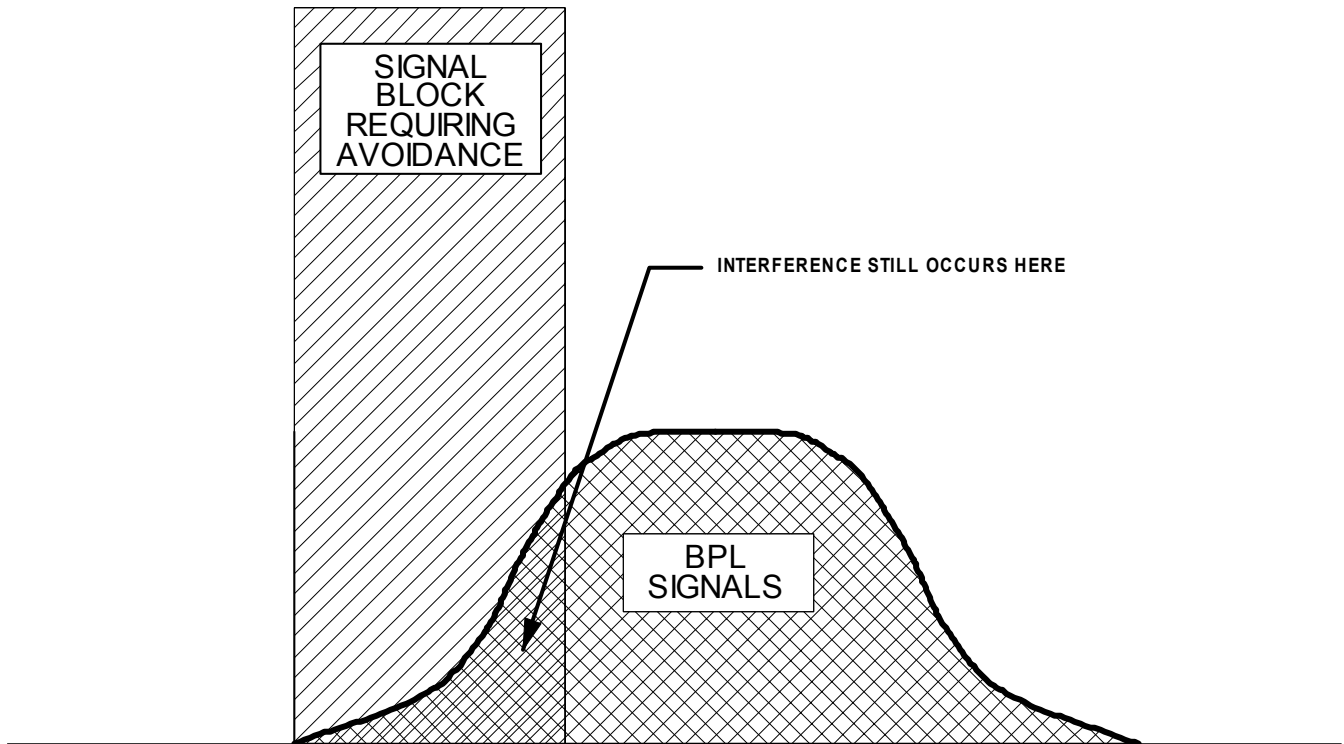
(DSP) technology has been able to provide "brick wall" filter topologies for many years. In such a case, frequencies within selected "windows" are easily reduced to, or near, the ambient noise floor. Such filter technology and topology exists and has existed in many communications systems and sub-components thereof and is a method of-choice when clear delineation's of spectrum are to be removed from a broadly generated spectrum.

Graphic examples of non-filtered and filtered spectrum are provided below. Note that the filter response curves are represented in a general form for illustrative purposes.



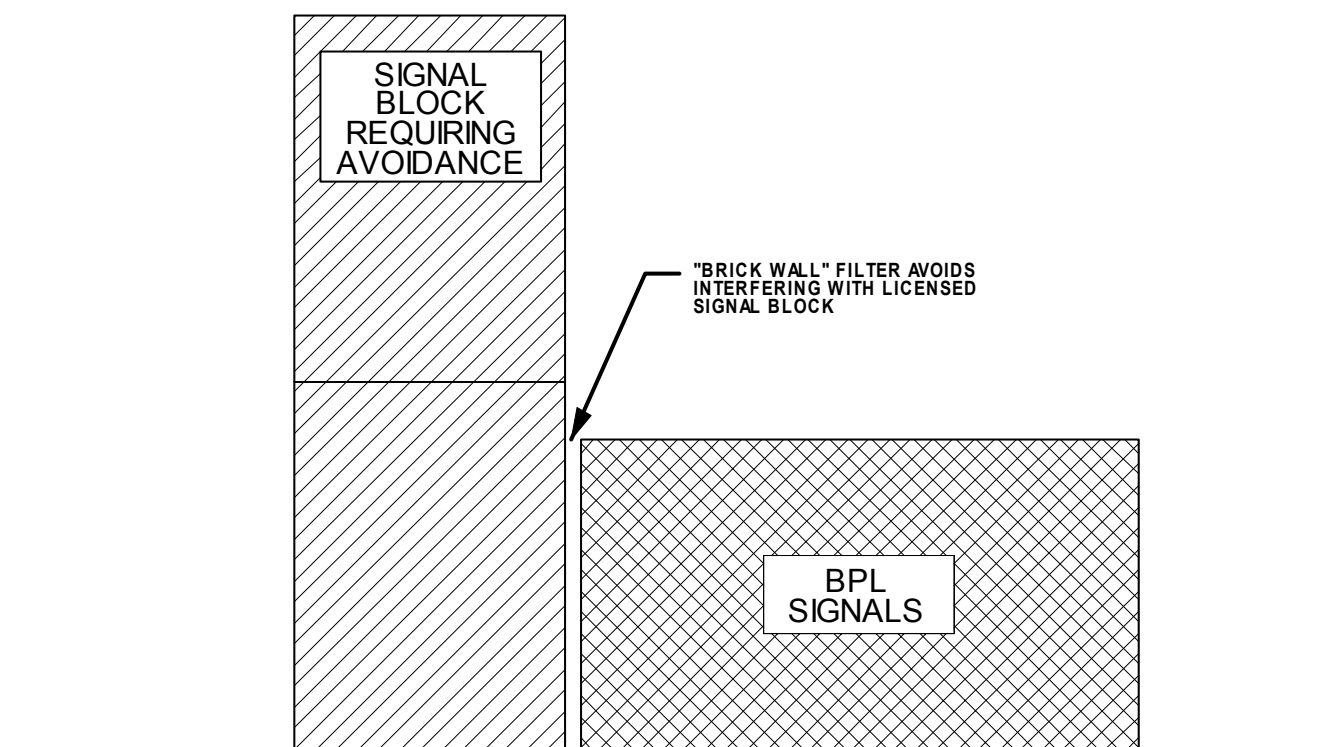
GRAPHIC SHOWING A PART 15 ACCESS BPL SIGNAL BLOCK
INTERFERING WITH A LICENSED SIGNAL BLOCK

The above figure shows how BPL signals overlap and harmfully interfere with Licensed Services. Note that where this occurs, normal operation by the Licensed Service is severely impaired or prevented.



GRAPHIC SHOWING A PART 15 ACCESS BPL SIGNAL BLOCK
WITH A NON-"BRICK WALL" FILTER APPLIED
INTERFERING WITH A LICENSED SIGNAL BLOCK

The graphic above shows the ineffectiveness of non-brick wall filtering. Note that Licensed Service users are harmfully and adversely affected by the poor attenuation of the filter "skirts".



GRAPHIC SHOWING A PART 15 ACCESS BPL SIGNAL BLOCK
WITH "BRICK WALL" FILTER APPLIED AND
AVOIDING INTERFERENCE WITH A LICENSED SIGNAL BLOCK

The above graphic shows the effect of utilizing a widely available "brick wall" filter topology. Note that the BPL signals do not intrude upon the Licensed Services spectrum when constrained by this type of filter.

Overall comments. My observations, related to 3 very small trial systems in the local geographic area clearly indicate that BPL, if allowed to be deployed in the current configuration will produce an Enforcement nightmare for the FCC, the Utilities and the Licensed Services.

In the local area, the utility made efforts at clearing harmful interference from the overhead segments only and none toward the underground segments. With respect to the latter, these underground segments radiate harmful interference, but at a reduced power level and with a smaller physical footprint.

It is inconceivable to me, that anyone with a modicum of technical expertise as purported to be the role of the FCC OET, could blindly advocate any such flawed technology. A signal at any frequency within the BPL-suggested frequency ranges coupled to a wire will benefit from the characteristics of that wire and it's designation as an "antenna".

I entreat the Commissioners to avail themselves of wise counsel of technical advisers when considering these critical issues. Heretofore, the Commission has enjoyed the support and respect of the majority of Licensed Service users in acting as a responsible steward of this singularly irreplaceable resource. Any failure to act similarly in this proceeding would beacon a message that the precious RF spectrum is free to plunder.

I also strongly request that the Commission take full notice of, and respect the content of, the NTIA report in its initial and final form. There is information within that comes from a substantial scientific undertaking and based upon well-founded technology.

Please don't let us down.

Respectfully submitted,

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